

## Supply, Trade-offs, and Synergies Estimation for Regulating Ecosystem Services of a Local Forest

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**Abstract :** The supply management of ecosystem services of local forests is an essential issue as it is linked to the ecological welfare of local residents. This study aims to estimate the supply, trade-offs, and synergies of local forest regulating ecosystem services using a land cover classification map (LCCM) and a forest types map (FTM). Rigorous literature reviews and Expert Delphi analysis were conducted using the detailed variables of 1:5,000 LCCM and FTM. Land-use scoring method and Getis-Ord Gi\* Analysis were utilized on detailed variables to propose a method for estimating supply, trade-offs, and synergies of the local forest regulating ecosystem services. The analysis revealed that the rank order (1st to 5th) of supply of regulating ecosystem services was Erosion prevention, Air quality regulation, Heat island mitigation, Water quality regulation, and Carbon storage. When analyzing the correlation between defined services of the entire city, almost all services showed a synergistic effect. However, when analyzing locally, trade-off effects (Heat island mitigation – Air quality regulation, Water quality regulation – Air quality regulation) appeared in the eastern and northwestern forest areas. This suggests the need to consider not only the synergy and trade-offs of the entire forest between specific ecosystem services but also the synergy and trade-offs of local areas in managing the regulating ecosystem services of local forests. The study result can provide primary data for the stakeholders to determine the initial conditions of the planning stage when discussing the establishment of policies related to the adjustment of the supply of regulating ecosystem services of the forests with limited access. Moreover, the study result can also help refine the estimation of the supply of the regulating ecosystem services with the availability of other forms of data.

**Keywords :** ecosystem service, getis ord gi\* analysis, land use scoring method, regional forest, regulating service, synergies, trade-offs

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